

CAI/P40 PRINTER

INSTRUCTION MANUAL

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CAI/P40 USERS MANUAL

1.0 INTRODUCTION

The CAI/P40 printer provides forty (40) columns of low cost hardcopy output on standard 4.2 inch thermal sensitive paper (CAI part no. CTPS-40BL). The printer interface is the CAI/O board. The printer hardware and firmware are compatible with the Sinclair ZX80 (8K Basic ROM) or the ZX81 computer.

2.0 PRINTER FIRMWARE

The software necessary to run the printer is provided on a 2716 EPROM (Erasable Programmable Read Only Memory) plugged onto the CAI/O board. If you received your CAI/O board and your CAI/P40 printer at the same time, the EPROM is installed and you can skip the following sections and proceed to section 3.0 PLUGGING THE PRINTER INTO THE CAI/O BOARD. If you received your CAI/O board prior to your printer, you will need to install the 2716 EPROM. Follow carefully the instructions in the following sections.

2.1 SEATING THE CAI/O EPROM

* * * Make sure you read sections 2.1 through 2.1.6 * * *
completely before installing the 2716 EPROM.

2.1.1 Disconnect power to your computer, then remove the CAI/O board from the computer. Remove the four plastic screws from around the outside edge of the CAI/O board.

2.1.2 Lift the cover from the CAI/O board and expose the circuit board. IMPORTANT - THE CAI/O BOARD MUST NOT BE PLUGGED INTO THE COMPUTER WHEN PERFORMING THIS OPERATION ! Note the three empty 24 pin IC sockets as shown in figure 1.

WARNING*****WARNING*****WARNING*****WARNING*****WARNING

The 2716 EPROM is susceptible to static charges. Follow all steps closely to avoid permanent damage to the EPROM. DO NOT remove the EPROM from the foam carrier until you are specifically told to in the following instructions.

WARNING*****WARNING*****WARNING*****WARNING*****WARNING

2.1.3 To prevent damage to the EPROM, first neutralize any static charge and potential difference by placing the EPROM and foam on the top of the CAI/O circuit board, foam side down.

2.1.4 With the foam still resting on the CAI/O circuit board, remove the EPROM. Note the alignment mark on one end of the EPROM as shown in Figure 1.

2.1.5 Insert the EPROM in the LEFT 24 pin socket with the alignment toward the REAR of the CAI/O board as shown in figure 5. BE SURE that ALL pins are in their respective holes, then apply gentle pressure on the EPROM until seated.

2.1.6 Reassemble the CAI/O board back into its case, and plug it into the computer with all power still off.

3.0 PLUGGING THE PRINTER INTO THE CAI/O BOARD

*****IMPORTANT*****

LEAVE THE PRINTER SWITCHES OFF WHEN PLUGGING IN POWER

*****IMPORTANT*****

3.1 The printer cable plugs into the 20 pin socket closest to the computer on the left side of the CAI/O board (figure 1). The cable coming from the printer terminates in a 20 pin connector. The cable must extend to the left when plugged into the socket on the CAI/O board (figure 1). Plug the cable into the CAI/O board, then plug power cord into a 110 v outlet.

3.2 Note the red off/on switch and the paper advance switch on the top of the printer. To turn the printer on, simply press down on the red button. Another press of this button will turn the power off. The yellow switch is for the paper advance. The paper is advanced through the printer by holding this switch down. When the switch is released the paper feed will stop.

3.3 Load paper into the printer as follows: Open rounded cover and place roll of paper in place, paper coming off bottom and towards print head. The small lever to the left of the paper window will release the print head from the black roller. Pull the lever toward the front. Place the leading edge of the paper under the edge-holders (before black roller), and then under the black roller and on through the print mechanism. Push the small lever back in place to engage the print head. Advance paper using yellow switch as far as needed. Replace cover.

3.4 The system should now be operational. The next section of the manual details how to check out and operate the printer.

***** PRINTER CHECK-OUT*****

4.0 The CAI/P40 printer may be used for the following purposes: Print String, List, Screen Dump, Enhanced String, Enhanced List, and Enhanced Screen Dumps. The string mode allows a string of data to be printed from a program. List mode provides a hard-copy listing of the current program in memory. The screen dump mode allows you to send the current screen to the printer. In the enhanced mode all of the characters are printed at twice the normal character height.

4.1 STRING MODE

The string mode allows you to send data or text to the printer under program control. The string variable P\$ is used to define the information you wish to print. For example, if you wish to print the line THIS IS A TEST, use the following program in the ZX80 computer.

```
10 LET P$="THIS IS A TEST"
20 LET Z=USR (8192)           (regular)
or =>20 LET Z=USR (8201)       (enhanced)
```

When you run this program with the ZX80 computer the television screen will go blank and the printer will print the text THIS IS A TEST after which the screen will return.

When using the ZX81 computer, FAST mode must be used when printing. If the computer is in the slow mode error I will appear on the screen. The error is generated by the printer to let the user know that they are operating in the SLOW mode. The following program illustrates how to use FAST and SLOW modes while printing:

```
10 FAST
20 FOR J=1 TO 10
30 LET P$="THIS IS A TEST"
40 LET Z=USR (8192)           (regular)
or =>40 LET Z=USR (8201)       (enhanced)
50 NEXT J
60 SLOW
70 FOR I=1 TO 10
80 PRINT "THIS IS A TEST"
90 NEXT I
```

The preceding program will print the line THIS IS A TEST ten times on the printer in the regular (or enhanced) mode. This sequence will be followed by printing THIS IS A TEST ten times to the screen in the slow mode. This program may also be used with the ZX80 computer if lines 10 and 60 are removed.

4.1.1 PRINTING A STRING VARIABLE

If you wish to print a string variable other than P\$, use the following program statements as a guide:

```
10 PRINT " WHAT IS YOUR NAME"
20 INPUT A$
25 FAST                      (ZX81 only)
30 LET P$=A$
40 LET Z=USR (8192)          (regular)
or =>40 LET Z=USR (8201)      (enhanced)
50 PRINT A$
```

4.1.2 PRINTING A NUMERIC VARIABLE TO THE PRINTER

If you wish to print the value of a numeric variable, you must first convert it to the string variable P\$. For example:

```
10 PRINT "WHAT IS YOUR AGE"
20 INPUT A
25 FAST                      (ZX81 only)
30 LET A$= STR$ A
40 LET P$=A$
50 LET Z=USR (8192)          (regular)
or =>50 LET Z=USR (8201)      (enhanced)
60 PRINT A$
```

4.1.3 ERROR CONDITION

If either of the USR numbers for the string printing routines are used without variable P\$ being defined, the computer will show the error H with the line number of the error.

4.2 LIST MODE

The list mode will allow you to obtain a hardcopy listing from the printer of the present program in memory. To obtain this listing you simply use one the following statements:

LIST Regular ModeLIST Enhanced Mode

LET Z=USR (8195)

LET Z=USR (8204)

NOTE: If you have a ZX81 computer, make sure you are in the FAST mode before entering the listing USR command. If you do not the computer will display error I. This is the SLOW mode error.

4.3 SCREEN DUMP MODE

The screen dump mode allows you to send the current screen to the printer. Have your computer in the fast mode (ZX81 only). Enter from the keyboard or in a program the USR call shown below. This should be done after all information of interest has been printed to the screen.

Regular modeEnhanced Mode

[line #] LET X=USR (8198)

[line #] LET X=USR (8207)

Example of Screen Dump: The following program illustrates the screen dump command by plotting a bar chart of yearly sales (up to ten years) on the screen and dumping it to the printer.

```
10 DIM X(10)
20 PRINT "NUMBER OF YEARS TO PLOT".
30 INPUT N
40 PRINT "FIRST YEAR"
50 INPUT F
60 LET F=F-1
70 LET M=0
80 FOR I=1 TO N
90 PRINT "SALES FOR ";I+F
100 INPUT X(I)
110 IF X(I)>M THEN LET M=X(I)
120 NEXT I
130 CLS
140 PRINT "ANNUAL SALES"
150 FOR I=1 TO N
160 PRINT I+F;" "
170 FOR J=1 TO X(I)/M*25
180 PRINT " ";
190 NEXT J
200 PRINT ""
210 NEXT I
220 LET Z=USR (8198) (regular or LET Z=USR (8207) enhanced)
```

Summary of Printer generated error codes

I - Computer in SLOW Mode

H - P\$ undefined and USR called

G - Printer not ready

Summary of User Numbers

<u>Function</u>	<u>Regular</u>	<u>Enhanced</u>
Print variable P\$	8192	8201
List program	8195	8204
Screen dump to printer	8198	8207

All schematics sent upon request from customer.

USE THIS FORM TO ORDER YOUR PRINTER PAPER

SEND CHECK, MONEY ORDER, OR CREDIT CARD NUMBER TO:

CAI INSTRUMENTS INC
PO BOX 2032
MIDLAND, MI 48640 (517) 835-6145

MASTER CARD _____ VISA _____

EXP. DATE _____

NAME _____ PLEASE PRINT

ADDRESS _____

CITY _____ STATE _____ ZIP _____

U.S. RESIDENTS ONLY

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
	P/40 PRINTER PAPER	1.95/ea	
	32 COLUMN PRINTER PAPER	1.95/ea	
	** SHIPPING CHARGES		
4rls	P/40 PRINTER PAPER	2.50 **	
8rls	P/40 PRINTER PAPER	3.50 **	
3rls	32 COLUMN PRINTER PAPER	1.95 **	
6rls	32 COLUMN PRINTER PAPER	2.50 **	
	SALES TAX (MICH. RESIDENTS ONLY)	4% TAX	
		TOTAL	

LARGER ORDERS FOR PRINTER PAPER CONTACT CAI

OUTSIDE OF U.S. RESIDENTS ONLY

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
	P/40 PRINTER PAPER	1.95/ea	
	32 COLUMN PRINTER PAPER	1.95/ea	
	*** SHIPPING CHARGES		
4rls	P/40 PRINTER PAPER	4.00 ***	
8rls	P/40 PRINTER PAPER	8.00 ***	
12rls	P/40 PRINTER PAPER	10.00 ***	
3rls	32 COLUMN PRINTER PAPER	2.95 ***	
6rls	32 COLUMN PRINTER PAPER	5.00 ***	
8rls	32 COLUMN PRINTER PAPER	6.50 ***	
		TOTAL	